autumns is 47°·8. The coldest autumn was that of 1849, the mean temperature being only 47°·0.

Hot autumns occurred in the years 1810, 11, 18, 21, 27, 28, 40 and 46; and the mean of the temperatures of these autumns is 52°·3. The hottest autumn was that of 1818, the mean temperature being as high as 54°·5.

Cold winters occurred in 1814, 16, 20, 23, 30, 38, 41, 45 and 47; and the mean of the temperatures of these winters is 34°·4. The coldest winter was that of 1814, the mean temperature being only 32°·7.

Hot winters occurred in 1822, 24, 28, 34, 35, 46, 48 and 49; and the mean of the temperatures of these winters is 41°·5. The hottest winter was that of 1834, the mean temperature being 43°·3.

12. "On Depressions of the Wet-bulb Thermometer during the Hot Season at Ahmednuggur, in the Deccan." By Colonel Sykes, F.R.S. &c. Received June 17, 1851.

The author states that he is indebted to Major William Coghlan for the tables of hourly depressions of the wet-bulb thermometer during the months of March and April of the present year, which form the subject of this communication, and which are a necessary supplement to his paper recently published in the Philosophical Transactions. The observations at Ahmednuggur, lat. 19° 05′ 49″ N., long. 74° 48′ 10″, elevation above the sea 1911 feet, which were undertaken by Dr. Forbes Watson, commenced on the 18th of March, and were continued to the 14th of April inclusive. They were made hourly from 6 A.M. to 9 P.M., giving 16 hourly records daily; but on the 24th and 29th of March, and on the 4th, 8th and 10th of April, they were continued throughout the twenty-four hours. The instruments employed were a dry- and a wet-bulb thermometer, by Adie, perfectly alike and giving precisely the same indications when both were dry, and a self-registering thermometer. They were suspended on a platform attached to a window under the verandah of the house, with a N.W. exposure, and were protected from radiation and reflexion of heat from the ground. As, from some preliminary observations, it appeared that the depression of the wet-bulb varied in every case with the intensity and duration of the draught of air upon it, in each observation a slight current of air was produced by a fan near the mouth of a funnel, the small end of which abutted on the wet-bulb, and the operation was continued until no further depression of the thermometer could thus be produced; a stronger current of air was then forced on the bulb by means of a large double bellows; and the result of each operation was recorded.

To obviate the anomalies which might arise from single observations, and to fix a mean state, for each hour, of the temperature of the air, the temperature of evaporation, and the mean depression of the wet-bulb, the means of these elements have been taken and are presented in a table. In this table are also given the dew-points as determined by means of Mr. Glaisher's factors and by Dr. Apjohn's

formula, with the differences by the two methods. The author remarks that the first feature which presents itself, in running the eye over this table, is the enormous amount of the depression of the wet-bulb compared with our European experience. In March, the mean depression at no hour was less than 14°·8 at 7 A.M., increasing to 29°·6 at 3 P.M.; in April, the mean depression was never less than 17°·3 at 7 A.M., increasing to 29°·9 at 3 P.M.; and many observations necessarily much exceeded the maxima means. The next feature is the increase of the mean depression with that of the mean temperature, from 6 A.M. until 3 P.M., and then a decline with the decline of temperature until 9 P.M.; but not in the same ratio as the increase in the morning. With reference to the practical application of these observations with a view to determine the amount of moisture in the atmosphere, or to fix the dew-point, the author remarks that it will be seen from this table that Mr. Glaisher's factors give a higher dew-point than Dr. Apjohn's formula, varying in March from 6°·1 at 8 A.M. to 11°·9 at 6 P.M., and in April from 5°·6 at 7 A.M. to 10°·4 at 9 P.M.; and these varying discrepancies do not appear to have gradations of increment or decrement dependent upon increase or diminution of mean temperature, or increase or decrease of the depression of the wet-bulb. These remarks apply to the means of the observations; but with reference to isolated observations, the discrepancies by the two methods become much greater. On the 9th of April, at 8 P.M., the temperature of the air being 97°, the wet-bulb with a moderate draught 60°·5, and with a strong draught 60°, the depressions were respectively 36°·5 and 37°, and the dew-point for the latter depression determined by Mr. Glaisher's factors would be 41·5, and 12·6 by Dr. Apjohn's formula. In illustration of this part of the subject the author gives an extract of a letter from General Cullen, from which it appears that at Cochin on the Malabar coast, the temperature of the air being 96°, the wet-bulb 61°, the dew-point by Jones's hygrometer 38°, the dew-point by Mr. Glaisher's factors would be 43°·5, and by Dr. Apjohn's formula 22°·1.

13. "On a General Law of Density in saturated Vapours." By J. J. Waterston, Esq. Communicated by Lieut.Colonel Sabine, R.A., V.P. and Treas. R.S. &c. Received June 19, 1851.

The author of this paper commences by stating that the relation between the pressure and temperature of vapours in contact with their generating liquids has been expressed by a variety of empirical formulæ, which, although convenient for practical purposes, do not claim to represent any general law; and that some years ago, while examining a mathematical theory of gases, he endeavoured to find out, from the experiments of the French Academy, whether the density of steam in contact with water followed any distinct law with reference to the temperature measured from the zero of gaseous tension (situated at −461° Fahr. by Rudberg's experiments, confirmed by Magnus and Regnault). To avoid circumlocution, he calls temperatures measured from this zero G temperatures, and observes